Abstract

AIM:

The aim of the study was to determine the accuracy of working length determination using *Tactile Sensation method, Digital Radiographic Method* (RVG*)* and *Electronic Apex Locator* (PROPEX – II) in lower premolars in-vivo, and to compare the lengths so measured to the actual working length after extraction, measured using *CBCT and Magnifying Loupe,* ex-vivo.

MATERIALS AND METHODS:

30 mandibular premolars scheduled for orthodontic extraction were selected. After informed consent from the patient, under local anaesthesia, access cavity was prepared, canal located and pulp extripated. The working length was determined by *Tactile Sensation method, Digital Radiographic Method* (Radiovisiography*)* and *Electronic Apex Locator* using PROPEX – II apex locator. The values were measured and tabulated. All the 3 methods were performed by 2 operators after blinding. After determining the working length in vivo, the teeth were extracted and the samples were then subjected to Cone beam computed tomography and the CBCT working length was determined. Now a K- file was inserted into the root canal until the file tip is visible at the apical foramen which was confirmed using a Magnifying loupe and these readings were measured as the actual working length of the tooth. and cross evaluated with all other working length values. The reliability analysis was also done to analyze the level of reliability of each group with the Actual Working Length values obtained using Magnifying loupe after extraction.

RESULTS:

Since the p value is 0.001 to 0.010, there is a significant difference between the methods in determining the working length. On comparison with the AWL values, working length

measurement using CBCT and Electronic apex locator are the most reliable method followed by radiographic method and tactile sensation respectively. Based on the correlation values on reliability, CBCT method have more positive correlation with actual working length measured using Magnifying loupe, followed by Electronic apex locator and then by RVG and tactile sensation.

CONCLUSION:

Within the limitations of the present study, it is concluded that

1. Comparison of working length measurement with Magnifying Loupe, CBCT, and other 3 conventional in vivo methods showed a significant difference in measurement.
2. Radiographic working length determination using RVG, can be considered as reliable tool when combined and confirmed with electronic working length measurement.
3. The EAL values of working length showed more positive correlation with the AWL values measured using magnifying loupe. Keeping other potential advantages in consideration, we conclude that the use of EAL technique clinically is useful in root canal treatment for measuring working length which correlates more positively with the AWL.
4. CBCT scans can be used as an alternative method for ascertaining the WL. If a patient has a preexisting CBCT scan, the clinician should take advantage of this technique as an alternative, reliable method for determining the WL.

KEYWORDS: Working length, Minor diameter, Tactile sense, Radiovisiography, Electronic Apex locator, CBCT, Magnifying Loupe.